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SOME PINEAPPLE PROBLEMS.

24th ARTICLE. - SLIPS AND SUCKERS.

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In the 11th Article of this series the practical problems in pineapple growing were stated to be: To secure (1) a large percent of plants that will fruit at an age of 12 to 18 months; (2) large size fruit; (3) fruit of good quality free from blemishes; (4) a large number of slips and suckers; (5) slips and suckers that are potentially capable of achieving the results mentioned above. These problems, as well as others pertaining to fruiting and shipping, were discussed in the foregoing articles except the one of slips and suckers. That has not yet been entirely solved but the amount of data that has accumulated during the past four years justifies the publication of this article.

PARTS USED FOR PROPAGATION. - It is well known that the pineapple plant is propagated mainly by means of slips and suckers, and growers in Puerto Rico generally know what offshoots these names apply to. Rattoons are left in the field to produce a crop but they are seldom transplanted and they are not usually considered desirable for that purpose. Occasionally the old stalk of the mother plant is used for propagation and the rattoon from that generally produces a satisfactory plant. Crown-slips are not planted because they are too small. Crowns have not, so far, been planted extensively in Puerto Rico, but when the fruit is canned there is no reason why well developed crowns from large fruit should not be utilized, for experiments have shown that they produce satisfactory results. Seeds are not used for commercial planting, but they are not difficult to handle and propagation from seed is a very promising method for the production of new varieties.

QUALITY OF SLIPS AND SUCKERS. - The term quality, as here used, denotes the capability of the slip or sucker to reproduce the characteristics of the mother plant. This may be fixed to the extent that one or more characteristics are inheritable throughout many generations regardless of environments, which is illustrated by the condition locally termed macho.

The quality may also be temporary, due to the environments under which the mother plant developed, which is illustrated by the starved spindly slip from a starved reddish colored spiny plant. This will be further elucidated in a later chapter.

SELECTION. - Several growers have practised systematic selection during the past few years and the results show that some improvement can be obtained by having the most intelligent workers go through the field, before the fruit is picked, and daubing a leaf on each of the most desirable plants with paint. From these plants the slips are gathered when large enough for planting. The points usually considered as a basis for selection are: large stocky plant, large size fruit, and an abundance of slips and suckers. Other points such as time of fruiting, shape of fruit and quality of fruit have not yet been extensively considered in commercial plantations and it is not yet definitely known to what extent these characteristics are reproducible by the progeny of the Red Spanish plant.

Selection can, of course, be further developed by always being on the lookout for outstanding types of plants. There are very frequently such but they are not always readily recognized. If the type appears to be undesirable it is well to pull the plant up and destroy it for if it remains the slips are liable to be planted and some types increase very fast as did the macho some years ago.

REJECTION. - Although a grower may not practice selection he always rejects some planting material. Most rejections are for size, but that differs according to personal views. Some growers reject all slips less than 5 inches long and others plant none less than 8 inches long. The reason for rejecting the smaller slips is that they are difficult to handle, and they are liable to become buried or uprooted which necessitates much replanting. Also the time from planting to fruiting is much longer for a 4 inch slip than for one 8 inches long.

The upper limit of size is also of some importance for a very large slip is liable to produce a plant that blooms prematurely. But regardless of size a slip should never be left on the mother plant after it stops growing. A slip that is partly dried up before it is picked always gives unsatisfactory results.

The statements regarding slips apply to suckers as well, especially in regard to large size. A sucker more than 10 inches long is liable to bloom in 8 to 10 months and when it does the fruit will be undersized. Promature

blooming of large slips and suckers may be very much lessened by heavy fertilization of the young plants, and of course by irrigation when water is the limiting factor.

A slip or sucker should be stout with broad firm leaves. If it is slim and the leaves are narrow and flacid it should be rejected.

THE MACHO. - The socalled macho (male) or riñón (kidney) type of plant is characteristically vegetative, being usually large and producing an abundance of slips. The fruit is small, knobby and often kidney shaped, hence the name. This type was called to the writer's attention 10 or 12 years ago by Mr. Bert E. Stevenson of the Palo Seco Plantation who suggested that the unfavorable characteristics might be inheritable. This has proved to be the case. Experiments with plants carried through several generations have shown that such plants always produced small misshaped fruit. This type of plant has been rogued out in most plantations during the past 5 to 6 years, but it is still in evidence. It appears to be a spontaneous development, but that has not yet been proved.

EFFECT OF ENVIRONMENTS. - Several million plants were imported from Cuba in 1921-1923. These proved to be generally superior to the majority of the plants then grown in Puerto Rico, and the progeny has continued to produce desirable plants and fruit under favorable soil and cultural conditions. This naturally suggested the possibility that the strain or strains of Red Spanish grown in Cuba might be superior to those grown in Puerto Rico.

With that theory in view investigations have been conducted during the past few years and the following conclusions may be drawn from the results obtained. (1) The characteristics of the Cuban plant may be reproduced from generation to generation, under soil and cultural conditions favorable to the pineapple plant. But this habit is not fixed to the extent that it can withstand extreme unfavorable conditions; (2) the same applies to plants grown in Puerto Rico before the introductions from Cuba. This was proved by the following experiment: slips from Cuban plants and from selected Puerto Rican plants were set in adjacent beds of extremely poor sandy soil which was only lightly fertilized. The two lots of plants behaved similarly, they were small, with narrow reddish leaves and they produced small sized fruit. The slips from these plants were set in medium good soil and given the usual care. The two lots of plants again behaved similarly, they were undersized and produced small size fruit. The experiment was not continued and it is not known how many generations might have been required for

bringing the plants back to their former productivity. It is unquestionable, however, that unfavorable environments may cause damage to one generation of plants which may not be overcome in several succeeding generations under favorable environments.

The most important environmental factors are soil, fertilizer, moisture, planting and cultivation which have all been discussed in previous articles. But the characteristics produced by those environments are not always reproducible under different environments. For instance the low, spreading habit of growth of the plant on some clay soils does not persist beyond the first generation when plants are transferred to sandy soils; nor does the upright habit of growth on the latter soils persist when the plants are transferred to the former soils. Likewise the prevailing shape and color of fruit in some plantations, or part of a plantation, may be maintained in those locations, but the habit is lost by changing the plants to different locations. Color and often shape of fruit are due to soil constituents, normally present or supplied, which is provable by the potassium nitrate results reported in Article 17 of this series.

The method of planting has a very decided effect upon the general development of the plant. For instance the plants in a two-row bed or in the outside rows of a four-row bed are better developed and produce larger fruit than those in the two middle rows of a four-row bed, especially when the soil is not entirely suitable.

Of other environmental factors altitude and temperature have been considered. Slips originating at about sea level, with a mean annual temperture of 80°F. and a mean monthly temperature of 75°F. for the winter months, were interchanged with others originating at an elevation of 1400 feet with a mean annual temperature of 73°F. and a mean monthly of 70°F. for the winter months. The results did not show variations that could be attributed to differences in altitude or temperature.

It is not improbable that more prolonged observation may show that an interchange of propagation material from one soil type to another or from one district to another may be beneficial, but the fact remains that with suitable soil, proper fertilization and cultivation a grower can improve his strain of plants and maintain it for a long time. If undesirable characteristics are produced due to local soil conditions interchange is of course desirable, even necessary. If on the other hand such characteristics are desirable they should be maintained by planting the same type or strain of plant on the same type of soil continuously.